

CLAIMS

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1. A gene encoding the following protein (a) or (b):
- (a) Semaphorin W protein comprising the amino acid sequence shown in SEQ ID NO: 3,

- 5 (b) a protein which comprises an amino acid sequence wherein one or more amino acids are deleted, substituted and/or added in the amino acid sequence shown in SEQ ID NO: 3, and which protein inhibits neurite outgrowth.

2. A gene comprising the following DNA (c), (d), or (e):

- 10 (c) Semaphorin W DNA comprising the base sequence shown in SEQ ID
NO: 1 or 2.

- (d) DNA which hybridizes under stringent conditions to DNA comprising the base sequence shown in SEQ ID NO: 1 or 2, and which encodes a protein inhibiting neurite outgrowth.

- 15 (e) DNA of the above item (d) which contains the base sequence shown in
SEQ ID NO: 4 or 5 and/or the base sequence shown in SEQ ID NO: 10.

3. A gene comprising DNA which hybridizes under stringent conditions to DNA comprising the base sequence shown in SEQ ID NO: 7, and which encodes a protein having a semaphorin domain.

4. A protein obtained by expressing a gene of any one of claims 1 to 3.

5. A gene encoding a protein comprising an amino acid sequence wherein one or more amino acids are deleted, substituted and/or added in the amino acid sequence shown in SEQ ID NO: 3, and which protein promotes neurite outgrowth.

6. A protein obtained by expressing a gene of claim 5.

7. A DNA which is cloned from a human cDNA library or a human genomic library, and which hybridizes under stringent conditions to DNA comprising at least part of DNA consisting of the base sequence shown in SEQ ID NO: 1, 4, or 10.

8. An expression plasmid which expresses either a gene of any one of claims 1 to 3 and 5, or DNA of claim 7.

9. A transformant transformed with an expression plasmid of claim 8.

10. A process for producing a recombinant protein, which process comprises culturing a transformant of claim 9, and recovering the recombinant protein expressed.

11. A peptide comprising a segment of at least six or more amino acids of a protein of claim 4 or 6.

12. A peptide of claim 11 which promotes neurite outgrowth.

13. A peptide of claim 11 characterized in that it contains glutamic acid residue at position 204 of the amino acid sequence shown in SEQ ID NO: 3 or an amino acid residue corresponding to the position of said glutamic acid residue.

14. An antisense nucleotide, or chemically modified variant thereof, which is directed against a segment of at least eight or more bases of a gene of any one of claims 1 to 3, or of DNA of claim 7.

15. An antisense nucleotide, or chemically modified variant thereof, of claim 14, characterized in that it inhibits expression of a protein of claim 4.

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16. An antibody against a protein of claim 4 or 6, or against a peptide of any one of claims 11 to 13.

17. A pharmaceutical agent comprising, as an active ingredient, a gene of any one of claims 1 to 3 and 5, DNA of claim 7, a protein of claim 4 or 6, a peptide of any one of claims 11 to 13, an antisense nucleotide or chemically modified variant thereof of claim 14 or 15, or an antibody of claim 16.

18. A method of screening for Semaphorin W antagonists, characterized in that it employs a protein of claim 4.

19. A Semaphorin W antagonist obtained by the screening method of claim 18.

20. A Semaphorin W antagonist of claim 19 which comprises a protein of claim 6, a peptide of any one of claims 11 to 13, or an antibody of claim 16.

21. A CNS-neuron regeneration promoter, characterized in that it contains at least one of antisense nucleotides or chemically modified variants thereof of claim 14 or 15, or Semaphorin W antagonists of claim 19 or 20.

22. A neurite outgrowth inhibitor for PNS-neuron, which comprises ~~characterized in that it contains~~ at least one of the proteins of claim 4.

23. A transgenic animal in which either a gene of any one of claims 1 to 3 and 5, or the DNA of claim 7 has been artificially inserted into its chromosome, or has been knocked out.

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Sub 3
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Sub 4
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